REMARKS

The Official Action and the objections and rejections raised have been carefully reviewed. The review indicates that the claims, especially as amended, recite patentable subject matter and should be allowed. Reconsideration and allowance are therefore respectfully requested.

Before contending with the grounds upon which the rejections have been made, a brief summarization of the essentials of the novel thermostable GuxA polypeptide heterologously expressed in an organism other than Acidothermus cellulolyticus, as well as variants and derivatives thereof will be provided to establish: a clearer line of demarcation between co-pending application no. 09/917,384; the basis for specific substantial asserted utility or well established utility; and to address the rejections made under the first and second paragraphs of 35 USC 112.

In the fermentation method for producing ethanol from biomass, where one of the major expenses incurred in SSF is the enzyme cost, and where there is a need to generate alternative cellulase enzymes other than those expressed in Acidothermus cellulolyticus capable of use in commercial-scale processing of cellulose to sugar for use in bio-fuel production, applicants are the first to invent a novel GuxA member of the glycoside hydrolase (GH) family of enzymes, which is a thermal tolerant glycoside hydrolase, useful in the degradation of cellulose.

The GuxA polypeptides of the invention include those having an amino acid sequence shown in SEQ ID NO:1, as well as polypeptides having substantial amino acid sequence identity to the amino acid sequence of SEQ ID NO:1 and useful fragments thereof, including, a first catalytic domain having significant sequence similarity to the GH6 family, a second catalytic

domain having significant sequence similarity to the GH12 family, a first cellulose binding domain (type II) and a second cellulose binding domain (type III).

The invention also provides a polynucleotide molecule encoding GuxA polypeptides and fragments of GuxA polypeptides, for example catalytic and cellulose binding domains. Polynucleotide molecules of the invention include those molecules having a nucleic acid sequence as shown in SEQ ID NO:2; those that hybridize to the nucleic acid sequence of SEQ ID NO:2 under high stringency conditions; and those having substantial nucleic acid identity with the nucleic acid sequence of SEQ ID NO:2.

Claims 1-24, 27-35, 43, 44, 48-54 and 58-75 were provisionally rejected under 35 USC 101 on the contention that the invention claimed is the same invention as claimed in claims 1-11, 26, 27, 36-43, 44, 45 and 69-74 of co-pending application no. 09/917,384. Applicants respectfully request reconsideration for the following reasons:

A careful review of the sequence listing for SEQ ID NO: 1, which is for Thermal Tolerant Cellulase from Acidothermus Cellulolyticus clearly establishes that it has 1228 amino acid residues. By contrast, SEQ ID NO: 1 for co-pending serial no. 09/917,384 is for Thermal Tolerant Exoglucanase from Acidothermus Cellulolyticus, and has 1121 amino acid residues. Copies of these sequence listings are submitted herewith in confirmation of the foregoing facts to establish, contrary to the assertions made in the Official Action, SEQ ID NOS: 1 of these two applications are not in fact identical.

Withdrawal of this provisionally rejected double patenting rejection is respectfully requested.

Claims 12-13 were rejected as being non-statutory under 35 USC §101; however, in view of the fact that these claims have been amended to recite the word "isolated" in prefixation of the thermal tolerant GuxA polypeptide, this rejection is no longer applicable.

Claims 1-11, 14-24, 27-35, 43-44, 48-54 and 63-75 were rejected under 35 USC §101 on allegations that these claims are not supported by the specification towards a specific substantial asserted utility or well established utility. Applicants controvert this rejection for the reason that, under the Summary of the Invention section and elsewhere throughout the specification, the "GuxA" is stated to have utility in the degradation of cellulose when administered to a biomass containing cellulose for reduction or degradation of the cellulose. Further, as indicated on page 9 of the specification ' "Cellulase activity" refers to any activity that can be assayed by characterizing the enzymatic activity of a cellulase. For example, cellulase activity can be assayed by determining how much reducing sugar is produced during a fixed amount of time for a set amount of enzyme (see Irwin et al., (1998) J. Bacteriology, 1709-1714). Other assays are well known in the art and can be substituted' Therefore, cellulase activity is a well established utility. Further still, under the INDUSTRIAL APPLICATIONS section of the specification it is stated that the GuxA polypeptides are effective cellulases for degrading cellulase by treating biomass "at a ratio of about 1 to about 50 of the GuxA: biomass." Finally, as discussed throughout in the specification, significant amino acid similarity of GuxA to other cellulases identifies GuxA as a cellulase and GuxA has two catalytic domains identified as belonging to the GH6 and the GH12 families, and it is well established that GH6 members degrade a cellulase substrate using an inverting mechanism and GH12 degrades cellulose using a retaining mechanism.

For at least the foregoing reasons (since the specification also indicates that use of GuxA polypeptide as a pharmaceutically acceptable carrier, for inclusion in detergents, for stonewashing jeans and biopolishing) there is unmistakably specific substantial asserted utility and well established utility. Withdrawal of the rejection is respectfully requested.

Claims 1-11, 14-24, 27-35, 43-44, 48-54, and 63-75 were rejected under the first paragraph of 35 USC §112 on allegations that one skilled in the art would not know how to use the claimed invention; however, as previously related in the paragraph next above, uses of the GuxA polypeptide have been specifically set forth throughout the specification – and not just as types of cellulases for degradation of cellulose towards making sugars and ultimately ethanol. Accordingly, this rejection is without a foundation and withdrawal of same is respectfully requested.

Claims 16-21, 27-28, 35, 43-44, 48-54, 63-67 and 69-75 were rejected on allegations on lack of enablement, under the first paragraph of 35 USC §112.

Applicants respectfully traverse this rejection and request reconsideration for the reason that, as previously asserted both directly and indirectly, the GuxA polypeptide as indicated in the second full paragraph under Table 1 may have an amino acid sequence of about 60% identical, and another embodiment is about 70% identical, or another embodiment about 90% identical to the GuxA amino acid sequence shown in Table 1. Further, this very same paragraph indicates that the percentage identity, also termed homology, is readily determined by comparing the two polypeptide sequences using any of the computer programs commonly employed for this purpose, such as the Gap program (Wisconsin Sequence Analysis Package, version 8 for Unix, Genetics Computer Group, University Research Park, Madison Wisconsin), which uses the algorithm of Smith and Waterman 1981, Adv. Appl. Math. 2:482-489.

Accordingly, contrary to the assertion made in this rejection, the specification teachings clearly enable one skilled in the art to which the invention pertains to make and/or use the invention.

Withdrawal of the rejection is respectfully requested.

Claims 14 and 34 were rejected under the second paragraph of 35 USC §112 on allegations of indefiniteness; however, in view of the antecedent basis for polypeptide now made by amendment to claim 1, this rejection is no longer applicable.

With regard to claim 34, its dependency on claim 29 is now correct for the reason that clear antecedent basis now exists for claim 34 as presently amended.

AMENDMENTS TO THE DRAWINGS

The disclosure was objected to because of informalities alleged in connection with FIG. 2; however, applicants submit herewith, a replacement sheet of FIG. 2 properly labeled as an Annotated Marked-up Drawing as well as the immediate prior version of FIG. 2 to establish that the replacement sheet now contains a good copy consistent with 37 CFR §1.121 (d).

In view of the foregoing amendments, remarks and arguments, it is believed that the application is now in condition for allowance and early notification of the same is earnestly solicited.

Respectfully submitted,

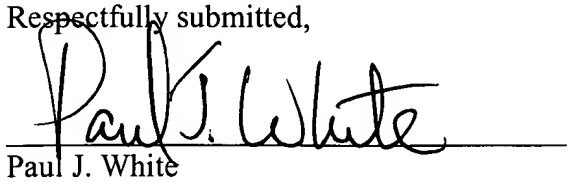

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FIG. 2